REMARKS

The Office Action dated April 8, 2004 has been carefully reviewed and the forgoing amendment and following remarks have been made in consequence thereof.

Claims 1-4, 6-14, 16-24, and 26-29 are pending in this application. Claims 1-4, 6-14, 16-24, and 26-29 stand rejected. Claims 5, 15, and 25 have been canceled.

Preliminarily, Applicants respectfully disagree with the assertion in the Office Action that "Bruchmann discloses a plurality of identical hall effect devices inserted within the slit 14 as seen in figure 1 of the '878 patent." Rather, in contrast to the present invention, Figure 1 of the '878 patent clearly shows three conductors (12), each having only one Hall sensor (42) positioned near each U-shaped conductor loop (14).

Moreover, Applicants disagree that Hall effect devices being known in the art to detect magnetic fields is sufficient reason to combine Bruchmann and Dames et al., when at column 1, lines 27-30, Dames et al. state, "[t]he use of a Hall sensor suffers from the disadvantage that Hall sensors can suffer from temperature dependence and are also relatively expensive." Applicants respectfully request that each prior art reference be taken as a whole for what it teaches, rather than merely providing isolated portions that support a desired outcome. Accordingly, there is no motivation to combine references when one of the references specifically expresses a teaching opposite from the claimed invention.

The rejection of Claims 1 and 3-10 under 35 U.S.C. § 102 as being anticipated by Bruchmann (U.S. Patent 6,472,878) is respectfully traversed.

Bruchmann describes a current measuring element including a plurality of current carrying conductors (12) having the shape of a flat rail in an insulating housing (10). Each of the flat, rail-like conductors 12 is formed in a U-shape such that a conductor loop (14) that is open at the top is produced and each conductor is associated with only one respective Hall effect device. Only one Hall sensor (42) is arranged in the proximity of each respective conductor (12).

Claim 1 recites a current sensor for an apparatus wherein the current sensor includes "a conductor comprising an aperture therethrough and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a

magnetic field having a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Bruchmann does not describe nor suggest a current sensor for an apparatus wherein the current sensor includes a conductor including an aperture therethrough and a plurality of Hall effect devices inserted at least partially within the aperture, wherein the conductor is configured to generate a magnetic field having a pre-determined shape that is detected by the Hall effect device and wherein the Hall effect device generates an output in response to the detected field. Specifically, Bruchmann does not describe nor suggest a current sensor including a conductor including an aperture therethrough.

Additionally, Bruchmann does not describe nor suggest a current sensor including a conductor that is configured to generate a magnetic field having a pre-determined shape wherein each of the plurality of Hall effect devices is configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field. Rather, in contrast to the present invention, Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect device. Applicants respectfully submit that a current carrying conductor formed in a U-shape such that a conductor loop that is open at the top is not equivalent to a conductor including an aperture as is described in the present invention.

Furthermore, even if the U-shaped conductor loop could be equated to a conductor including an aperture, Bruchmann does not describe nor suggest a conductor including an aperture and a plurality of Hall effect devices that are inserted at least partially within the aperture. Rather, Applicants respectfully submit that, at most, Bruchmann describes only one Hall effect device positioned within each conductor loop. As such, Bruchmann does not describe nor suggest all of the claimed elements of the present invention. Accordingly, Claim 1 is submitted to be patentable over Bruchmann.

Claims 3, 4, and 6-9 depend from independent Claim 1. When the recitations of Claims 3, 4, and 6-9 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 3, 4, and 6-9 likewise are patentable over Bruchmann.

Claim 10 recites a current sensor for an apparatus including "a conductor including an aperture therethrough and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Bruchmann does not describe nor suggest a current sensor for an apparatus including a conductor including an aperture therethrough and a plurality of Hall effect devices inserted at least partially within the aperture, the conductor is configured to generate a magnetic field including at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from the first direction, and a pre-determined shape wherein each Hall effect device is configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field. Specifically, Bruchmann does not describe nor suggest a current sensor for an apparatus including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture nor a conductor that is configured to generate a magnetic field that includes a pre-determined shape wherein each Hall effect device is configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field.

Rather, in contrast to the present invention, Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect device. Applicants respectfully submit that a current carrying conductor formed in a U-shape such that a conductor loop that is open at the top is not equivalent to a conductor including an aperture as is described in the present invention.

Furthermore, even if the U-shaped conductor loop could be equated to a conductor including an aperture, Bruchmann does not describe nor suggest a conductor including an aperture and a plurality of Hall effect devices that are inserted at least partially within the aperture. Rather, Applicants respectfully submit that, at most, Bruchmann describes only one Hall effect device positioned within the loop formed by each conductor. As such,

Bruchmann does not describe nor suggest all of the claimed elements of the present invention. Accordingly, Claim 10 is submitted to be patentable over Bruchmann.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 3-4 and 6-10 be withdrawn.

The rejection of Claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Bruchmann (U.S. Patent 6,472,878) in view of Dames et al. (U.S. Patent No. 6,414,475) is respectfully traversed.

Bruchmann is described above. Dames et al. describe a fiscal electricity meter that includes sensing coils to sense current flowing through conductors within the meter. Notably, at Col. 1, lines 27-30, Dames et al. recite that "[t]he use of a Hall sensor suffers from the disadvantage that Hall sensors can suffer from temperature dependence and are also relatively expensive." As such, there is no motivation to combine references when one of the references teaches away from the claimed invention.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Dames et al., nor Bruchmann, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Dames et al. with Bruchmann because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "[i]t would have been an obvious to one having an ordinary skill in the art at the time the invention as made to modify the current sensor of Bruchmann and use within the electricity meter of Dames et al. for the purpose of sensing current in the power line" suggests combining the disclosures.

Bruchmann is cited for its teaching of a current sensor, and Dames et al. are cited only for their teaching of a current transformer in a residential meter. However, neither Bruchmann nor Dames et al., considered alone or in combination, describe or suggest a

conductor including an aperture. Moreover, neither Bruchmann nor Dames et al., considered alone or in combination, describe or suggest a plurality of Hall effect devices inserted at least partially within the aperture. Rather, Dames et al. teaches away from Bruchmann and the present invention. For example, at column 1, lines 27-30, Dames et al. state, "[t]he use of a Hall sensor suffers from the disadvantage that Hall sensors can suffer from temperature dependence and are also relatively expensive." Moreover, if art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited are, as a whole, is not suggestive of the presently claimed invention. Specifically, Applicants respectfully submit that Dames et al. teach away from Bruchmann and the present invention, and as such, there is no suggestion or motivation to combine Dames et al. with Bruchmann, and Dames et al. teaching away from Bruchmann supports the nonobviousness of the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claim 2 be withdrawn.

Further, and to the extent understood, neither Bruchmann nor Dames et al., considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 2 depends from Claim 1 which recites a current sensor for an apparatus wherein the current sensor includes "a conductor comprising an aperture and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a magnetic field having a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Neither Bruchmann nor Dames et al. alone or in combination describe or suggest a current sensor for an apparatus wherein the current sensor includes a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture wherein the conductor is configured to generate a magnetic field having a pre-determined shape that is detected by the Hall effect device and wherein the Hall effect device generates an output in response to the detected field.

Specifically, neither Bruchmann nor Dames et al., considered alone or in combination describe or suggest a conductor including an aperture. More specifically, neither Bruchmann nor Dames et al., considered alone or in combination describe or suggest a conductor

including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture.

Rather, Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect device, and Dames et al. describe an electricity meter that uses coils to sense and transform current in a meter conductor and states that "[t]he use of a Hall sensor suffers from the disadvantage that Hall sensors can suffer from temperature dependence and are also relatively expensive." Applicants respectfully submit that neither Bruchmann nor Dames et al., considered alone or in combination, describe nor suggest the claimed invention, and Dames et al. teach away from Bruchmann and the present invention. Accordingly, Claim 1 is submitted to be patentable over Bruchmann in view of Dames et al.

Claim 2 depends from independent Claim 1. When the recitations of Claim 2 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 2 likewise is patentable over Bruchmann in view of Dames et al.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claim 2 be withdrawn.

The rejection of Claims 11-29 under 35 U.S.C. § 103(a) as being unpatentable over Plis et al. (U.S. Patent No. 5,854,995) in view of Bruchmann (U.S. Patent No. 6,512,359) is respectfully traversed.

Bruchmann is described above. Plis et al. describe an electricity meter and metering methods for vector metering of electricity which sense line voltage and line current signals on the power line, convert the sensed signals into a digital signal, and compute vector metering quantities for the power line over a determined interval of orthogonality for the sensed line voltages and line currents. Vector computing means for computing vector metering quantities is implemented using a digital signal processor working in combination with a general-purpose microprocessor, integrated within an electricity meter.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP § 2143. Neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 11 recites a residential electricity meter including "a voltage sensor and a current sensor, said current sensor comprising a conductor comprising an aperture and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a magnetic field having a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a voltage sensor and a current sensor wherein the current sensor includes a conductor that includes an aperture and a plurality of Hall effect devices inserted at least partially within the aperture, the conductor is configured to generate a magnetic field having a pre-determined shape that is detected by the Hall effect device and wherein the Hall effect device generates an output in response to the detected field.

Specifically, neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a current sensor that includes a conductor including an aperture. Moreover, neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture.

Rather, in contrast to the present invention, Plis et al. describe an electricity metering method for vector metering of electricity which sense line voltage and line current signals on the power line, convert the sensed signals into a digital signal, and compute vector metering quantities for the power line over a determined interval of orthogonality for the sensed line voltages and line currents, and Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect

device. For at least the reasons set forth above, Claim 11 is submitted to be patentable over Plis et al. in view of Bruchmann

Claims 12-14 and 16-19 depend from independent Claim 11. When the recitations of Claims 12-14 and 16-19 are considered in combination with the recitations of Claim 11, Applicants submit that dependent Claims 12-14 and 16-19 likewise are patentable over Plis et al. in view of Bruchmann

Claim 20 recites a residential electricity meter including "a voltage sensor and a current sensor, said current sensor comprising a conductor comprising an aperture and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a voltage sensor and a current sensor wherein the current sensor includes a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture, the conductor is configured to generate a magnetic field that includes at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from the first direction, and a pre-determined shape, the Hall effect device configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field. Specifically, neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a current sensor that includes a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture. Rather, in contrast to the present invention, Plis et al. describe an electricity metering methods for vector metering of electricity which sense line voltage and line current signals on the power line, convert the sensed signals into a digital signal, and compute vector metering quantities for the power line over a determined interval of orthogonality for the sensed line voltages and line currents and Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated

with only one respective Hall effect device. For at least the reasons set forth above, Claim 20 is submitted to be patentable over Plis et al. in view of Bruchmann

Claim 21 recites a method for sensing voltage and current in a residence wherein the method includes "providing an electricity meter comprising...a voltage sensor...a current sensor, wherein the current sensor includes a conductor that includes an aperture and a plurality of Hall effect devices inserted at least partially within the aperture, wherein the conductor is configured to generate a magnetic field having a pre-determined shape, and the Hall effect device is configured to detect the pre-determined shape and generate an output."

Neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a method for sensing voltage and current in a residence wherein the method includes providing an electricity meter that includes, a voltage sensor, and a current sensor, wherein the current sensor includes a conductor that includes an aperture and a plurality of Hall effect devices inserted at least partially within the aperture, wherein the conductor is configured to generate a magnetic field having a pre-determined shape, and the Hall effect device is configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field.

Specifically, neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a current sensor that includes a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture.

Rather, in contrast to the present invention, Plis et al. describe electricity metering methods for vector metering of electricity which sense line voltage and line current signals on the power line, convert the sensed signals into a digital signal, and compute vector metering quantities for the power line over a determined interval of orthogonality for the sensed line voltages and line currents and Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect device, but neither Plis et al. nor Bruchmann describe or suggest a conductor including an aperture and a plurality of Hall effect devices inserted at least partially within the aperture. For at least the reasons set forth above, Claim 21 is submitted to be patentable over Plis et al. in view of Bruchmann

Claims 22-24 and 26-28 depend from independent Claim 21. When the recitations of Claims 22-24 and 26-28 are considered in combination with the recitations of Claim 21, Applicants submit that dependent Claims 22-24 and 26-28 likewise are patentable over Plis et al. in view of Bruchmann

Claim 29 recites a method for sensing voltage and current in a residence wherein the method includes "providing a residential electricity meter comprising...a voltage sensor...a current sensor, said current sensor comprising a conductor comprising an aperture and a plurality of Hall effect devices inserted at least partially within said aperture, said conductor is configured to generate a magnetic field comprising at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from said first direction, and a pre-determined shape, each said Hall effect device configured to detect said pre-determined shape and generate an output."

Neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a method for sensing voltage and current in a residence wherein the method includes providing a residential electricity meter that includes a voltage sensor, and a current sensor wherein the current sensor includes a conductor that includes an aperture and a plurality of Hall effect devices inserted at least partially within the aperture, the conductor is configured to generate a magnetic field that includes at least a first magnetic field component having a first direction and a second magnetic field component having a second direction different from the first direction, and a pre-determined shape that is detected by the Hall effect device and wherein the Hall effect device generates an output in response to the detected field.

Specifically, neither Plis et al. nor Bruchmann, considered alone or in combination, describe or suggest a residential electricity meter including a current sensor that includes a conductor that is configured to generate a magnetic field having a pre-determined shape and a plurality of Hall effect devices located within the conductor aperture that are configured to detect the pre-determined shape and wherein the Hall effect device generates an output in response to the detected field.

Rather, in contrast to the present invention, Plis et al. describe an electricity metering methods for vector metering of electricity which sense line voltage and line current signals on the power line, convert the sensed signals into a digital signal, and compute vector metering quantities for the power line over a determined interval of orthogonality for the sensed line

voltages and line currents and Bruchmann describes a current measuring element including a current carrying conductor that is formed in a U-shape such that a conductor loop that is open at the top is produced and each conductor is associated with only one respective Hall effect device. For at least the reasons set forth above, Claim 29 is submitted to be patentable over Plis et al. in view of Bruchmann

In addition to the arguments set forth above, Applicants respectfully submit that the rejection of Claims 11-29 under 35 U.S.C. § 103(a) as being unpatentable over Plis et al. (U.S. Patent No. 5,854,995) in view of Bruchmann (U.S. Patent No. 6,512,359) are further traversed on the grounds that the Section 103 rejection of the presently pending claims does not show some suggestion or motivation to combine Plis et al. and Bruchmann, nor is it shown in the cited references a reasonable expectation of success of the combination. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. Neither Plis et al., nor Bruchmann, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Plis et al. with Bruchmann because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching. Rather, only the conclusory statement that "[i]t would have been an obvious to one having an ordinary skill in the art at the time the invention as made to modify the current sensor within the electricity meter of Plis et al. and use within the current sensor of Bruchmann for the purpose of sensing current in the power line." suggests combining the disclosures.

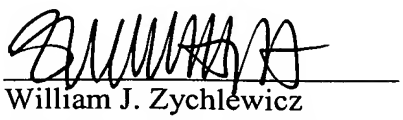
As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Plis et al. are cited only for their teaching of an electricity meter that includes a voltage sensor and a current sensor and Bruchmann are cited for their teaching of a current sensor that includes a U-shaped loop in a conductor with only one Hall effect device proximate the conductor. Since there is no teaching nor suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claims 11-29 be withdrawn.

For the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 11-29 be withdrawn.

In view of the foregoing remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully Submitted,



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